DECLASS REVIEW by NIMA/DOD

6/17/98

Approved For Release 2002/06/17 : CIA-RDP78B04747A001500010011-3

1.3.3 The maximum film advance shall be 52".

1.4 The take-up spindles for negative and positive film shall be equipped with a constant torque take-up motor to insure the smooth and continuous rewinding of the films fed out by the film drive mechanism.

1.4.1 The capacity of both the negative and positive take-up spindles shall be 500 ft. and the spindles shall accommodate all types of standard spools from 70 mm to 9-1/2" wide.

2. RESOLUTION LOSS:

2.1 Minimum: less than 1% high contrast.

2.2 To insure a minimum resolution loss, the printer shall be equipped with a specially constructed vacuum frame which will insure perfect contact across the 9-1/2" maximum width and 50" maximum length of the print capacity.

2.2.1 To insure perfect contact, the printer shall be equipped with an optically flat quartz glass top of sufficient thickness and strength to maintain a flat undistorted contact between negative and positive films during the printer operation.

2.2.2 The printer shall be equipped with a specially designed vacuum blanket which will produce satisfactory and constant contact across the total width of 9-1/2" and maximum length of 50" of the printing area during the printing period.

2.2.3 This blanket shall be so constructed that it will not produce any permanent visible marks at the dividing points where the contact blanket seals the two films in contact.

2.2.4 The vacuum mechanism producing the necessary vacuum contact shall be equipped with an auxiliary reservoir so that a minimum time is required to build the vacuum up to a proper height to insure satisfactory continuous contact during the printing operation.

2.2.5 The printer shall be equipped with a satisfactory solenoid valve arrangement which will exhaust the vacuum whenever a printing cycle has been completed so that the time required to reduce the vacuum to zero will be at a minimum, thus permitting the actuation of the film pull down without undue delay.

2.2.6 The vacuum motor and pump shall be housed outside the printing room and proper vacuum lines shall be provided by the contracting activity.

2.3 The optical glass top shall be mounted in a frame which permits the raising of the glass top parallel to the printing surface by an auxiliary motor to a sufficient height to free the two films completely thus permitting the film advance without possible stress or damage to either negative or positive film.

2.3.1 The frame shall be arranged to permit the easy loading of negative and positive films when the printing unit has to be loaded for printing purposes.

The arrangement of the printing frame as described under #2 will insure a minimum resolution loss and at the same time a zero distortion factor. To implement the proper transmission of images from negative to positive with the above outlined capabilities of minimum resolution loss and no distortion, the printer shall be equipped with.....

3. A traveling printing light.

3.1 The mechanism housing for the traveling printing light shall be so designed that various light sources could be interchanged and tested to determine the best performance for the type of film and duplicating material to be used.

3.1.1 One of the embodiments of the printing light, a Zirconium light, shall be investigated, it has the advantage of a substantially pinpoint light emanating area and, therefore, with the proper collimating condensing system producing parallel light beams at the printing slot will materially assist in producing high resolution and minimizing resolution loss.

3.1.2 Another possible light source is an Iodine quartz bar light which is long enough to cover the entire printing slot and, therefore, might not require collimating condensers.

3.1.2.1 The Iodine quartz bar lights, which have exceptionally high intensity, will speed up the printing operation, but will also create a problem of heat dissipation and removal of which will have to be solved in line with the sterile requirements of the instrument.

3.2 The intensity of the printing light shall be such that with the proper condenser system producing collimated parallel light beams at the printing slot, the average film negative density of 1.5 can be printed to a positive film emulsion type SO278 at an average printing speed of twenty five feet per minute with a print density of [illegible] thus with a maximum pull down of four feet producing a complete film cycle every ten seconds.

3.2.1 The printing light source shall be supported above the printing frame in a specially constructed parallel track which will travel the light from one end of the printing frame to the other at a variable speed which can be coupled to a photo electric scanner to compensate for varying densities of the negative film to be printed.

3.2.2 The mechanism employed in transporting the light source across the printing frame shall be such that a continuously smooth constant speed light travel will be achieved at a maximum rate of 20" per second and a minimum rate of 2" per second, thus making it impossible to print densities of print negative film up to 3.5 to the above named positive emulsion and produce copy densities up to .7.

3.3 The light assembly shall be equipped with a variable width printing slot which can be adjusted manually to suit the required printing speed and negative density to achieve the above mentioned printing capability.

3.3.1 This printing slot shall be variable from a minimum of zero to a maximum of one inch in continuous smooth increments and a dial shall be provided at a convenient visible location, that is visible to the operator so that the width of the printing slot can be determined at one glance.

3.3.2 The length of the printing slot shall be variable from a minimum of 60 mm to a maximum of 9-1/2" in continuous mode so that by setting a conveniently accessible and visible dial, the proper printing width can be established to suit the width of the film to be printed.

3.4 The travel of the light source shall be interlocked by means of a specially designed memory circuit with the film travel so that no overlapped exposures occur within a frame.

3.5 The printing light shall be equipped with an electrically operated shutter mechanism which will close the printing slot whenever a printing cycle has been completed and will open the printing slot whenever the next cycle is to be printed.

4. The mechanical operation of the printer shall be electrically interlocked so that a completely automatic printing operation can be established where the films are placed in contact in the vacuum frame, the light source is exposed by actuation of the shutter, the printing light starts traveling at a predetermined printing speed which could be varied by a photo electric scanner, scanning the reflected light from the negative film to be printed and once the printing light reached the end of its travel which is established by the amount of film advanced at one time, the shutter is closed, the glass frame is lifted, the two films are advanced together and while this occurs the light is returned to its starting point at a considerably higher rate of speed to [illegible] position. The printing frame is lowered, the vacuum re-established and the cycle repeated.

This cycle will be or can be repeated until either negative or positive film have run out or until the necessary film strip to be printed has been completed.

The mechanical and electrical interlocks of the above described cycling operation are straightforward and reasonably simple in their design and do not produce any appreciable problems in their solution, since [redacted] has, in the past, designed and built mechanisms with complex selector mechanical sequencing which have functioned satisfactorily in every instance.

STATINTL

4.1. Since the print film is in close contact with the negative to be printed and of a light color, thus backing up the negative, it will produce a reasonably accurate distribution of densities. If the printing speed is to be controlled, the density changes can be picked up by a photocell scanner positioned to prescan the film through a second slot located immediately ahead of the printing slot and illuminated by a red safe light bar, thus not affecting photographically the print film. The output of the photocell can be fed into an appropriate electronic circuit, which will increase or decrease the voltage across the armature of the DC print motor directly in proportion with the reflected light intensity and speed up or slow down the printing light, to even up the densities.

4.1.1 Since the time lag, necessary after converting the output of the photocell into appropriate voltages, to change the speed of the print motor, is a finite amount, it will be necessary to set the scanning slot sufficiently ahead of the printing slot so that at normal printing speeds, the actual change of speed is coincident with the position of the printing slot over the scanned area.

4.1.2 If the light source to be used is highly sensitive to voltage changes and the intensity of the light is proportionate to the change of voltage, the photocell can scan the printing slot itself. Again by proper electronic circuitry an inverse ratio of voltages to scanned densities can be fed directly into the power supply of the light source itself and thus dim or brighten the light intensity at inverse ratios to the reflected light values fed into the photocell circuit.

4.1.2.1 If the response of the light source itself is to all intents and purposes instantaneous, since the photocell output and concomitent electronic circuitry are for all practical purposes instantaneous, the light can be adjusted while the printing light is exposing a specific area of the printing slot.

4.1.2.2 The zirconium light is highly sensitive to voltage changes and, since this light is not a function of a current flowing through a filament and therefore dependent on the temperature of the filament

and therefore dependent on the temperature of the filament for changes of light intensity, thus requiring a reasonably finite length of time, it can change its intensity, for all practical purposes, instantaneously.

4.2 To insure the automatic stopping of the film cycling mechanism, when a set number of frames have been printed, the mechanism shall be equipped with a cycle counter which can be preset to the number of cycles required to complete a specific printing operation.

4.2.1 The printer shall be equipped with a second cycle counter and the capability of advancing positive film only, thus making it possible to preset a number of duplicates for a specific number of frames to be printed simultaneously.

4.2.2 In this mode of operation, the printer will print at a specific light intensity slot width and length, a strip of negative film in contact with the positive. At the end of the printing cycle, the glass frame will lift, separate the two films, advance the positive film the predetermined amount, then re-establish contact and repeat the printing cycle for as many times as the predetermining counter is set.

4.3 A second capability can be incorporated into this printing mechanism which will advance a predetermined length of negative film, print a number of positive duplicates preset on the predetermining counter and repeat this procedure until either negative or positive film have been exhausted or until the predetermined number of complete printing cycles have been accomplished.

ATTACHMENT NO. 2

TECHNICAL CAPABILITIES OF THE COMPANY

History of the Personnel and Facilities of the Company

Available For This Purpose

A printer as outlined on the technical proposal included herewith is composed of various mechanical and electrical and electronic components, the design of which has to be handled by personnel well versed in the art and thus having the necessary capabilities to design and build the proper components into the unit.

Specifically, the printer in question can be divided into the following components:

1. Light Source and Light Control.
2. Light Travel Mechanism.
3. Vacuum Frame.
4. Film Transport Mechanism.
5. Related Electric and Electronic Control Devices.

In examining the capabilities of [redacted] we would like to take each one of these specific fields of engineering, design, research and development and specifically examine the background of the personnel assigned to each one of these activities.

STATINTL

1. LIGHT SOURCE AND LIGHT CONTROL

STATINTL [redacted] President and Chief Design Engineer, has been involved in the design and application of all types of light sources for photographic purposes for the past twenty two years. Specifically, he pioneered the use of pin point light sources both for projection

and contact printing and has been using and experimenting with the Zirconium pin point light source from its first release for commercial applications in 1946.

He designed the first commercially available Zirconium and pin point light source enlargers marketed under the trade name of Microtronics in 1947.

STATINTL The Naval Records Management submitted a set of specifications to [redacted] in 1947 for a new continuous roll contact printer capable of printing from 16 mm, 35 mm and 70 mm microfilm in continuous rolls up to 1,000 ft. capacity, since at that time the contact printers available had a minimum loss factor of 30% and in quite a few instances as high as 60% and therefore, a new printer was required which would reduce the loss factor considerably to prove the usefulness of positive microfilm printers for various applications.

STATINTL [redacted] designed the [redacted] PP4 printer which embodied a Zirconium light source with other completely new principles of continuous contact printing which was found to have an average loss factor of less than 8%. STATINTL

STATINTL STATINTL Since then, [redacted] has designed several new and improved models of continuous roll contact printers and at this date, [redacted] STATINTL [redacted] is marketing two models commercially identified as model no. PD302 and model no. PD302X which on tests conducted by various industrial and government activities far exceeds in quality and performance any other continuous roll contact printer available at this date. The loss factor at high contrast is less than 5%.

A modification of the PD301 printer, the forerunner of the present model PD302, has been offered to the Armed Services and the Air Force by the [redacted] STATINTL

STATINTL
STATINTL The [redacted] has modified one of the [redacted] STATINTL printers originally designed by [redacted] and is offering such a STATINTL printer presently for sale to the Armed Services specifically for 70 mm applications. As a matter of fact, the printers designed by [redacted] for continuous roll contact printing are presently used by every known microfilm laboratory of any quality by the U. S. Navy, Air Force, STATINTL Signal Corps, Corps of Engineers, Army Map Service, Central Intelligence Agency and every other organization in the government or industry which prides itself in producing quality positive reproductions. [redacted] is a graduate of the University of Zurich, Switzerland and of Vienna, Austria holding degrees in electrical and mechanical engineering and Dr. of Technical Sciences.

2. LIGHT TRAVEL MECHANISM AND FILM TRANSPORT MECHANISM

STATINTL [redacted] Chief Engineer of [redacted] STATINTL Inc., has been responsible for the design of all machines presently offered for sale and on special design for various government and industrial organizations and has fifteen years back-

ground in the specific photographic industry; first, with [redacted] under guidance of [redacted] and subsequently with [redacted]

He was instrumental in designing the only successful continuous flow 4X Enlarger which enlarges from 70 mm film to 9½" wide film at a rate of 60 ft. per minute at a synchronous speed with maximum resolution capabilities of twenty five lines per millimeter on the 9½" duplicate film. This unit is presently in the possession of the Army Map Service and is operated there under the supervision of the Central Intelligence Agency. [redacted] holds a degree in mechanical engineering at [redacted]

3. VACUUM FRAME

The design of the vacuum frame and all the necessary components to control and develop the proper vacuum contact will be under the supervision of [redacted] Assistant Chief Engineer of [redacted]

[redacted] has had extensive experience in design of complex electromechanical devices with [redacted] New Jersey, as Chief Draftsman. Also with [redacted] in the same city. He has designed a great number of complex electromechanical components for airplane instrumentation and control and for allied products. He joined the staff of [redacted] in 1960 and has proven himself to be of outstanding value in the application of proven mechanical and electrical components. He holds a degree in mechanical engineering and design at [redacted]

4. RELATED ELECTRIC AND ELECTRONIC CONTROL DEVICES

All the electric and electronic control devices will be designed under the supervision of [redacted]. [redacted] has had fifteen years experience in the design of complex electric and electronic devices with [redacted] and holds a degree in electrical engineering at Clarkson College of Potsdam, New York.

[redacted] has proven himself of exceptional electrical wizardry in designing and devising complicated electromechanical and electronic circuitry for the control of automatic photographic devices including proper sequencing of highly complex mechanical and photographic [illegible] and holds a degree in electrical engineering at [redacted]

STATINTL

STATINTL To insure the proper application and use of photographic principles, [redacted] is employed by [redacted] in a STATINTL consulting capacity and can look back with pride at a career of thirty five years in the design application and supervision of highly complicated and complex photographic applications and processat at [redacted] holds a degree of mechanical and chemical engineering at the University of Hanover, Germany.

STATINTL STATINTL

STATINTL In support of the design and research capabilities of the staff innumerated above, [redacted] is Project Engineer with a history of over thirty years of design activity covering a cross section of electromechanical devices including eight years at [redacted] STATINTL in which he was in charge of important projects which [redacted] conducted for various branches of the United States Government. [redacted] is a graduate of the [redacted] in mechanical engineering.

STATINTL STATINTL

STATINTL A list of products and mechanisms designed and developed by the scientific personnel of [redacted] covers a cross section of all types of photographic mechanisms and machines from fully automatic engineering reproduction cameras for microfilm to fully automatic photocopy machines capable of producing full size 18" x 24" cut sheet paper images from any size document.

STATINTL STATINTL

All the photocopy equipment presently offered for sale by the [redacted] and by the [redacted] have originally been designed and developed by [redacted] STATINTL

Patents are held on a great number of photographic mechanisms ranging from cameras to processors to printers and are mostly assigned to private organizations who employ the capabilities of [redacted] and his staff to design specific mechanisms for their production and use such as the photocopy machines mentioned above. STATINTL

STATINTL The staff at [redacted] was instrumental in designing the only standard approved X-Ray Fluoroscopic 70 mm camera presently on the list of the standardization board of the Armed Services. Patents have been issued on that camera and are presently assigned jointly to [redacted] and the [redacted] STATINTL

STATINTL

STATINTL A line of completely automatic microfilm and allied projection enlarging equipment has been designed and built, which automatically scans a roll of film 16 mm, 35 mm or 70 mm wide, projects the image to paper at varying magnification ratios from a minimum of 3X to a maximum of 18X and advances the film frame by frame, exposes [redacted] automatically.

These mechanisms have various capabilities of repeat operation from the same negative and are completely automatic in their operation. They were designed in 1947 and are still being used at the Central Intelligence Agency in their graphic reproduction center.

STATINTL A total of about 460 odd different photographic mechanisms and machines have been developed, designed and built by the staff of [redacted] in their present activity and previous affiliations under the guidance of [redacted]

STATINTL The Corporation presently occupies one and one-half floors in a manufacturing building in the heart of [redacted] STATINTL with a total floor space of 20,000 square feet.

The layout and arrangement of the floor area is well suited for standard production processes, and a separate area has been set aside specifically for research, development and experimental purposes on the floor below the production facilities.

Production facilities consist of a well equipped machine shop with equipment capable of machining all types of materials to a reasonably high accuracy of .0001, and consisting of lathes, milling machines, surface grinders, drill presses, semi-automatic screw machines and allied equipment. A complete sheet metal fabricating shop with all the necessary components such as shears, brakes, benders, punch presses, welding equipment -- gas and electric, and allied machinery to produce any sheet parts or assemblies necessary.

An inspection department capable of accurately checking out all of the machined and purchased components to comformity with engineering specifications.

A woodworking shop producing all of the crates and packing containers necessary for shipment of equipment.

STATINTL A subassembly department in which all of the various components are assembled and checked out and the final assembly, testing and calibrating department where all the products manufactured by [redacted] are carefully checked to exacting standards before they are released for shipment.

An engineering department equipped with all the necessary engineering aids, including Diazo printing and microfilm reader printing equipment so that an efficient engineering operation can be maintained.

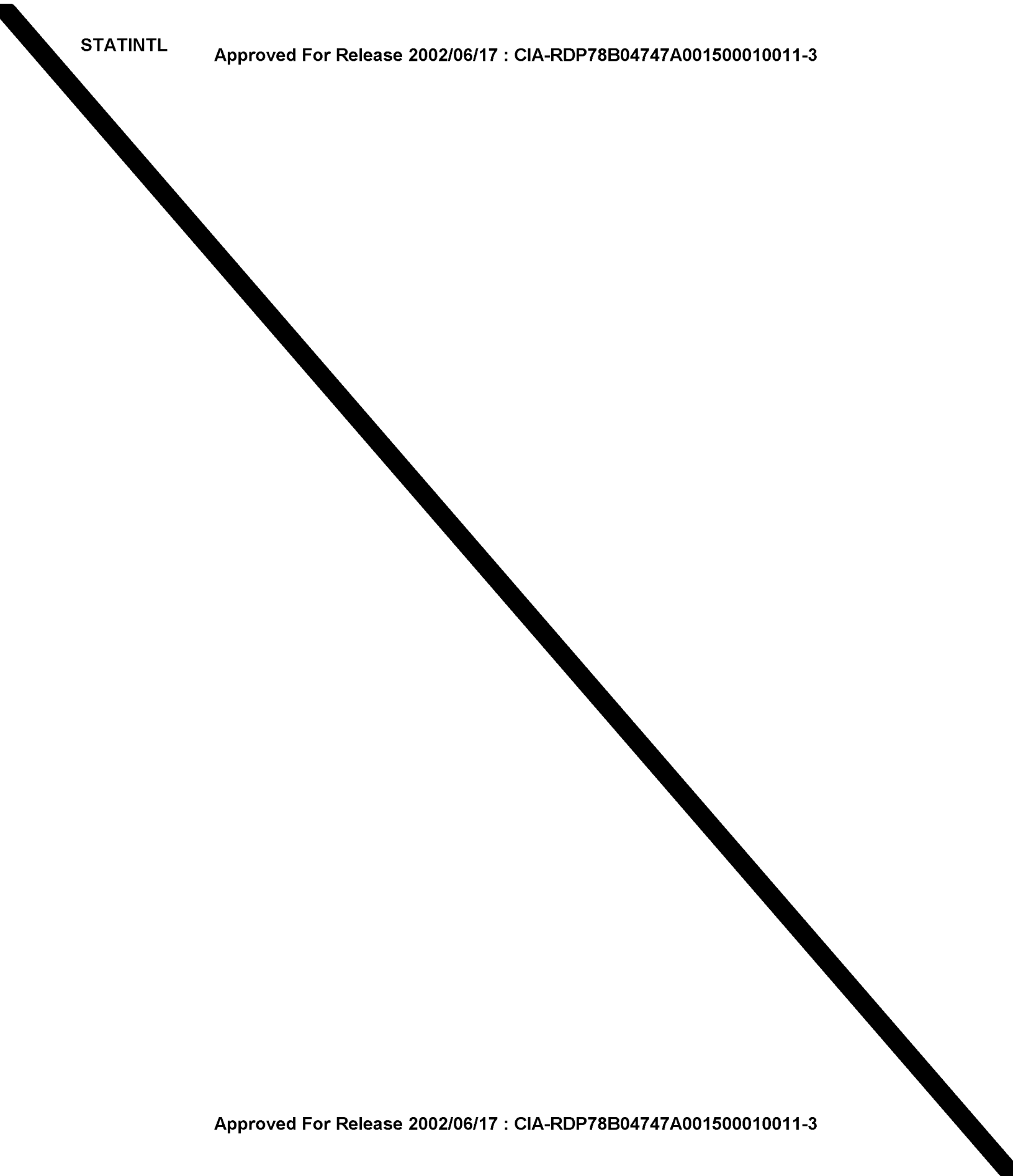
The [illegible] executive [illegible] purchasing departments together with the accounting department.

Half again the floor area is presently readied as a research and development laboratory which will include a properly equipped dark room activity having manual and automatic processing facilities, enlarging and printing equipment together with a suitable optical bench for testing of optical components; an electronic laboratory equipped with all the necessary measuring devices for testing and calibrating highly complex electric and electronic components; a mechanical laboratory and experimental shop equipped with the necessary basic machine tools such as milling machines, lathes, drill presses, surface grinders, etc.; an engineering department employing six full-time engineers; proper conference rooms and an assembly department, in which experimental models can be assembled and tested. This area will be restricted for confidential and secret projects and is presently under [redacted]

STATINTL

The research department will be equipped to handle any photographic or photomechanical problems and will have all the necessary testing and measuring devices to properly evaluate the performance of any device designed and developed in the area.

Proper lab technicians for photographic; mechanical and electrical research will be employed in this area and the necessary clearances will be available for the personnel on that floor so that any project, which has qualified restrictions, will be properly conducted under security regulations which comply with the most stringent rulings of the Defense Department.



Approved For Release 2002/06/17 : CIA-RDP78B04747A001500010011-3